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SURVEY OF METEOROLOGICAL SATELLITE GROUND-BASED RECEIVING EQUIPMENT

Compiled by NOAA/USA

January 1987

SAT-6

TECHNICAL DOCUMENT

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W O R L D M E T E O R O L O G I C A L O R G A N I Z A T I O N

SURVEY OF METEOROLOGICAL SATELLITE GROUND-BASED RECEIVING EQUIPMENT

Compiled by

National Environmental Satellite, Data and
Information Service
National Oceanic and Atmospheric Administration
U.S. Department of Commerce
WASHINGTON, D.C. 20233
USA

January 1987

WMO SATELLITE REPORTS

SAT-l Application of Satellite Technology Annual Progress Report 1983

SAT-2 Satellite Capabiliies to 1995 for Meteorology and Operational Hydrology (by David S. Johnson)

SAT-3 Application of Satellite Technology Annual Progress Report 1984

SAT-4 Application of Satellite Technology Annual Progress Report 1985

SAT-5 Application of Satellite Technology Annual Progress Report 1986

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INTRODUCTION

This report provides information about different- types of equipment needed to receive various meteorological satellite data transmissions. Such equipment includes antennas, receivers, demodulators, formatters and (secondarily) basic display equipment such as facsimile and video monitors. The text was prepared from responses received to a questionnaire sent to over 100 companies around the world. It was not our intention to -include all types- of display systems, since many such systems available for other uses are adaptable to satellite data. The emphasis, therefore, is mainly on "front-end" equipment for satellite data reception. Characteristics of the meteorological satellites operated by the European Meteorological Satellite Organization (EUMETSAT), India, Japan, USSR, and the USA are described in a publication by the World Meteorological Organization, "WMO 411 - Information on Meteorological Satellite Programmes Operated by Members and Organizations."

Because of rapidly changing and expanding technologies associated with satellite data and the receiving equipment, many of the products listed in this equipment survey are entirely new. Some of the equipment relies on microprocessors and/or microcomputers to do the majority of the data processing. This reduces the need for hardware which is not nearly as flexible. The reader should note that microprocessor systems may be much more flexible and may offer greater advantaqes than equipment available in the past.

This work was completed by METSAT, Inc. in Fort Collins, Colorado, under contract to the National Oceanic and Atmospheric Administration's National Environmental Satellite, Data, and Information Service (NESDIS). Neither NOAA/NESDIS nor METSAT, Inc. takes responsibility for errors which may appear. Every attempt was made to do a thorough review, as well as to include all possible manufacturers and/or distributors of equipment, and to be as accurate as possible.

Robert W. Popham
Satellite Program Specialist
National Oceanic and
Atmospheric Administration

CONTRIBUTING COMPANIES

AUSTRALIA
- PCM Electronics Pty, Ltd

BELGIUM
- Bureau Technique Wintgens, S.A.

CANADA
- Array Systems Computing, Inc.
- MacDonald Dettwiler and Associates Ltd.
- PC Solutions, Ltd.
- Perceptron Computing, Inc.
- Sea Scan

JAPAN
- Japan Radio, Ltd.

THE NETHERLANDS
- DELTRON International Trading Company

SWITZERLAND
- Compagnie Industrielle Radioelectrique
- Technavia, S.A.

UNITED KINGDOM
- Feedback Instruments Ltd.

UNITED STATES
- Alden Electronics, Inc.
- Alden International, Inc.
- Aydin Monitor Systems
- Daytron Systems, Inc.
- Electra-Services
- Fairchild Weston Systems, Inc.
- Feedback, Inc.
- FG Engineering Company
- Hamtronics, Inc.
- Harris Corp.
- International Systems and Software, Inc.
- Leonessa Engineering
- METSAT, Inc.
- Metsat Products, Inc.
- Microcomm
- Microdyne Corporation
- Microlog Corporation
- Northern Video Graphics, Inc.
- Raytheon Marine Co.
- SASC Technologies, Inc.
- Weather One, Inc.

LIST OF ACRONYMS/DEFINITIONS

APT	Automatic Picture Transmission
ARGOS	French-built Data Collection and Location System
ATN	Advanced TIROS-N (successor to NOAA series)
AVHRR	Advanced Very-High-Resolution Radiometer
bps	bits per second; Mbps = megabits-per second
dBm	dB above a milliwatt
dB	decibel (ratio)
DCLS	Data Collection and Location System
DCP	Data Colletion Platform
DCS	Data Collection System
DMSP	Defense Meteorological Satellite Program
DSB	Direct Sounder Broadcast
ERP	Effective Radiated Power
GAC	Global Area Coverage
GMS	Japanese weather satellite
GOES	Geostationary Operational Earth Satellite
GOMS	USSR weather satellite
HCMM	Heat Capacity Mapping Mission
HF	High Frequency
HRFAX	High-Resolution FAX
HRPT	High-Resolution Picture Transmission (AVHRR data)
HZ	Hertz [cycles per second); MHz = megahertz
I F	Intermediate Frequency
LAC	Local Area Coverage
LAND-SAT	Land Satellite
LNA	Low-Noise Amplifier
lpm	lines per minute
LRFAX	Laser FAX
LUT	Local User Terminal
MDUS	Meteorological Data User Station
METEOR	USSR weather satellite
METEOSAT	European Meteorological Satellite
NESDIS	National Environmental Satellite, Data and Information Service
NIMEUS	USA experimental satellite series
NOAA	National Oceanic and Atmospheric Administration
NOAA	USA polar-orbiting satellite series
NRZ	Normal Return to Zero
PDUS	Primary Data User Station
RF	Radio Frequency
RTTY	Radio Teletype
SDUS	Secondary Data User Station
SHF	Super High Frequency (S-band)
SMS	Syncrhonous Meteorological Satellite (predecessor to GOES)
SPOT	Satellite Pour Observation Terrestrial
TBUS	Teletype Bulletin-U.S.
TIP	TIROS Information Processor - data
TIRDS	Television and Infrared Observation Satellite
TOVS	TIRDS Operational Vertical Sounder
UHF	Ultra High Frequency
VAS	VISSR Atmospheric Sounder
VDC	Volts Direct Current
VHF	Very High Frequency
VISSR	Visible and Infrared Spin-Scan. Radiometer
WEFAX	Weather Facsimile (FAX)

Company Name and Address: PCM Pty, Ltd.
20-22 Hardner Road
Mount Waverley
Victoria, 3149
Melbourne
AUSTRALIA

Mr. Wally Blauberg
Program Manager

Telephone Number: (03) 543 6000

Telex: AA 36728 PCMELB

1. Equipment Type: Complete ground receiving station

2. Equipment Used for the Following Satellites/Data Transmission:
Satellites: NOAA, GMS, METEOSAT; Data: HRPT

3. Equipment Trade Name/Model: SAT-TRAC

4. Equipment Description: The HRPT receiving system consists of the following functional units:

a - Antenna and feed assembly
b - Tracking mount
c - Control system
d - Low-noise receiver converter
e - Demodulator decoder
f - NOAA signal simulator
g - Control computer

The system provides a cost-effective solution to the high-quality reception and processing of HRPT data.

The system is of highly modular construction and allows flexibility in configuration to meet particular requirements and ease of maintenance in remote installations.

5. Special Features: Economy in initial purchasing without sacrifice of system performance or reliability.

All major components and sub-systems manufactured by PCM, resulting in realistic delivery schedule and low maintenance costs.

Error tolerant pre- and post-sync detection. Separation of TIP data from NOAA data stream. Reconfiguration to standard serial data format, AVHRR video format.

6. Price Information: US$250,000 upwards depending upon specific applications and requirements for spares, special test equipment? consumables, training, installation etc., which are all offered as options.

7. Delivery Schedule: 8-12 months

8. Additional Comments: The system is a wholly Australian high-technology product being the result of collaboration between PCM and CSIRO.

   Design of the equipment is based directly on performance-proven systems. The station is modular in design and can be adapted to the individual requirements of the user. The philosophy embodied in the design of the equipment by PCM enables the PCM system to interface directly with all image processing systems.

   Replacement of the NOAA circularly-polarized feed with a circular/linear hybrid will allow reception of both NOAA and GMS signals with the same antenna with the provision of a separate GMS receiver and a GMS formatter board which performs sync detection and A-D conversion. A total NOAA/GMS system is available.

9. Equipment Demonstration Locations: CSIRO
   Bureau of Meteorology
   AUSTRALIA

Company Name and Address: **Bureau Technique Wintgens S.A. (B.T.W. S.A.)**
Rue Neuve 7-9
8-4700
Eupen
BELGIUM/EUROPE

Edgar H. Wintgens
President

Telephone Number: (32-87) 74.01.21

Telex: Belgium 49 258 BTWEUP 8

1. **Equipment Type: Bureau Technique Wintgens S.A. is an assembler of Meteorological Satellite Receiving Equipment. The subsystems are purchased at different vendor locations. There are no meteorological satellite receiver manufacturers in Belgium**

   Since 1948 BTW is the leading supplier of meteorological instruments and systems in Belgium.

Company Name and Address: Array Systems Computing, Inc.
5000 Dufferin Street
Suite 200
Downsview, Ontario M3H 5T5
CANADA

Brian Wannamaker
Research Scientist

Telephone Number: (416) 736-0900

Telex: 063666 .TO 21:ARY001 (Array Telex/via EOS)

1. Equipment Type: Weather satellite ground receiving station.

2. Equipment Used for the Following Satellites/Data Transmission:
Satellites/Data transmissions: NOAA series/HRPT

3. Equipment Trade Name/Model: HRPT reception system

4. Equipment Description: Complete RF front end with 1.8 m azimuth-over-elevation parabolic antenna, receiver, and synchronizers optimized for HRPT. Antenna movement +360 to -360 in azimuth, 0-180 in elevation under computer control. Flexible data handling system including computer, optional array processor, image processor, soft copy or hardcopy displays, mass storage and communication links.

5. Special Features: System analyzes the incoming signal to derive absolute positional information to be incorporated with high-level orbital modeling for subsequent accurate image mapping and mosaicing. System can be configured for unattended operation with time scheduled output products. Various CPU/array processor pairings for particular processing power needs. Numerous scientific processing routines.

6. Price Information: Depending on options, CAN$150,000-CAN$1,500,000; US$110,000 - US$1,100,000)

7. Delivery Schedule: Depending on options, 6-14 months ARO

8. Additional Comments: Array Systems is a vendor of equipment from various primary suppliers and software developer of systems tailored to meet the user's specific needs in system operation, data analysis and image processing. Similarly cansupply to user specifications for GOES, METEOSAT, RADARSAT, NOAA/APT.

9. Equipment Demonstration Locations: An Array Systems supplied system can be seen by prior appointment at: Atmosphreic Environment Service
Downsview, Ontario
CANADA

Company Name and Address: MacDonald Dettwiler and Associates Ltd.
3751 Shell Road
Richmond, British Columbia
CANADA V6X 2Z9

Telephone Number: (604) 278-3411
(604) 278-0531 (facsimile)

Telex: 04-355599

Macdonald Oetwiler and Associates Ltd. (A):

1. Equipment Type: NOAA/HRPT format synchronizer and test pattern generator
2. Equipment Used for the Following Satellites/Data Transmission: NOAA/HRPT
3. Equipment Trade Name/Model: AVHRR format synchronizer and test generator, MacDonald Dettwiler Model 882
4. Equipment Description: Preprocessor for NOAA/AVHRR and TIP data, AVHRR output data format is suitable for input to a computer processing system. TIP data format is suitable for interface to a computer or recorder. Includes HRPT signal simulator and test-pattern generator.
5. Special Features: Error-tolerant synchronization detection. Video data compression using three selectable sets of built-in 5-band look up tables. Four selectable test generator video data patterns.
6. Price Information: US$30,000
7. Delivery Schedule: 90-180 days
8. Additional Comments: Optional programmable look-up table for use with computer-based systems. Similar equipment available for METEOSAT, METEOSAT/PDUS and GOES/VISSR.

Macdonald Dettwiler and Associated Ltd. (B):

1. Equipment Type: GMS/HRFAX digitizer and test pattern generator
2. Equipment Used for the Following Satellites/Data Transmission: GMS HRFAX
3. Equipment Trade Name/Model: GMS/HRFAX digitizer and test pattern generator, MacDonald Dettwiler Model 8818
4. Equipment Description: Preprocessor for GMS/HRFAX data. HRFAX signal output data format is suitable for input to a computer process.75 system. Includes HRFAX signal simulator and test pattern generato
5. Special Features: Noise-tolerant phase-locked synchronization detection. Two selectable test generator video data patterns.
6. Price Information: US$35,000
7. Oelivery Schedule: 90-180 days
8. Additional- Comments: None

Macdonald Dettwiler and Associated Ltd. (C)

1. Equipment Type: Meteorological satellite ground receiving station

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/HRPT (AVHRR, TIP, TOVS); GMS/HRFAX, GMS/Stretched VISSR; METEOSAT/PDUS, GOES/VISSR (Mode-A, Mode-AAA); GOES/VAS

3. Equipment Trade Name/Model: Meteorological Data Acquision.and Analysis System (METDAS). Models: METOAS-GMS; METDAS-GOES; METOAS-METEOSAT; METOAS-TIROS; METDAS-GMS/TIROS: METOAS-GOES/TIROS; METDAS-METEOSAT/TIROS.

4. Equipment Description: A new generation of satellite data reception and processing systems for polar-orbiting and/or geostationary satellites based on the field-proven MacDonald Dettwiler METDAS software and the newest generation of DEC VAX systems. Includes antenna, RF subsystem, satellite data processor, digital tape archive, meteorological workstation(s) and optional facsimile interface.

5. Special Features: Interactive image display and animation. Overlay of meteorological fields on satellite imagery. Precision basemap generation and overlay. Automated operation. Archiving and restoral of data. High throughput processor. Full set of application options for satellite data analysis.

6. Price Information: From US$500,000, depending upon specific satellites and optional features selected. Spares, consumables, training and installation can be quoted to customer requirements.

7. Delivery Schedule: 180-240 days

8. Additional Comments: METDAS makes data from meteorological satellites readily and quickly available to forecast meteorologists as soft copy digital image displays and hard copy facsimile. The superior speed and accuracy with which data are provided, allow meteorological staff to monitor, analyze and forecast significant weather systems and events as they affect the forecast region. The use of automated schedule-driven functions allows regular and routine portions of the system to run unattended.

   The METDAS VAX-based system provides long-term compatibility with vendor system, ease of maintenance and ease of future upgrade.

   MacDonald Dettwiler's strength is in providing complete turnkey systems for meteorological applications. MacDonald Oettwiler products and services have established a consistent record of high quality, and METDAS continues this reputation for excellence in the meteorological marketplace.

9. Equipment Demonstration Locations: The Pacific Weather Centre,
   Environment Canada
   Vancouver
   CANADA

Macdonald Oettwiler and Associated Ltd. (D):

1. Equipment Type: Meteorological workstation for the interactive display of satellite imagery.

2. **Equipment** Used for the Following Satellites/Data Transmission: The workstation can be added to any METDAS system or can receive data from any system via an RS232-C link.

3. Equipment Trade Name/Model: METstation Model 10

4. Equipment Description: The MET-station 10 is a workstation designed for the interactive display of satellite and weather radar images. It can be configured for both local and remote connection to METDAS and other meteorological systems.

5. Special Features: High-resolution color display. Interactive contrast enhancement. 24-bit pseudocolor displays. Image animation to ten frames/second. Basemap and other graphics overlays. NTSC, PAL and RS170 RGB video outputs. Instantaneous zoom (1-16), roam and pan.

6. Price Information: US$40,000

7. Delivery Schedule: 90-120 days

8. Additional Comments: A full-functioned image analysis package is available as an option.

9. Equipment Demonstration Locations: The Pacific Weather Centre
Environment Canada

Company Name and Address:
Box 5550 Station B
Victoria, British Columbia V8R 6S4
CANADA

H. Day Chapin
Director

Telephone Number: (604) 383-1123

Telex: None

1. Equipment Type: Personal computer weather and APT display system

2. Equipment Used for the Following Satellites/Data Transmission: NOAA(TIROS)/APT

3. Equipment Trade Name/Model: Not Available

4. Equipment Description: System in development to process APT and WEFAX signals

5. Special Features: Designed for use on personal computer systems (IMB-PC or compatible)

6. Price Information: Not established as yet

7. Delivery Schedule: December, 1987

a. Additional Comments: System currently under development. Interested potential users may contact us regarding their specific requirements and desired features.

9. Equipment Demonstration Locations: None at present

Company Name and address: Perceptron Computing, Inc. (PCI)
4800 Clufferin Street, Suite 202
Downsview, Ontario M3H 5S8
CANADA

Telephone Number: (416) 736-0452

Telex: 06-217652

1. Equipment Type: Image- analysis system

2. Equipment Used for the Following Satellites/Data Transmission: NOAA; GOES/VISSR; others

3. Equipment Trade Name/Model: PACE (Picture Analysis, Correction and Enhancement)

4. Equipment Description: A computer-based digital image analysis system. Image processing techniques supported include display, enhancement, correction and classification of image data. Can be used in stand-alone configuration or as an adjunct to a receiving station. Real-time remapping capability.

5. Special Features: State-of-the-art man-machine interface. Hardware independence allows this package to run on most commercially available displays: Adage, Aries, Comtal, Gould, Ebba, Genisco, Imavision, Masscomp, Pictral. CPUs supported: Cyber, VAX, POP, Perkin-Elmer, 68000, IBM PC-AT.

6. Price Information: Prices range from US$8,000, depending on CPU. Hardware available in a package form.

7. Delivery Schedule: 60-120 days

8. Additional Comments: Completely programmable. Provides the ability to upgrade video displays and CPUs as required. Interface provides for quick training. Independent of hardware configuration.

9. Equipment Demonstration Locations: Unknown

Company Name and Address: a n
RR #3. Caledon East
Ontario LON 1E0
CANADA

Telephone Number: (416) 880-0528

Telex : None

1. Equipment Type: Weather satellite receiver

2. Equipment Used for the Following Satellites/Data Transmission: TIROS/NOAA series APT

3. Equipment Trade Name/Model: Digital APT receiver

4. Equipment Description: Demodulates VHF signal of APT transmission. Data signal digitized at 4.8 kHz driven by phase-locked carrier to remove Doppler-shift distortion. Rate-of-change of Doppler measured and reported. Digitization at 8 or 10 bits resolution. Output signal via IEEE-488 or RS232. Standard analogue output also available.

5. Special Features: Designed to feed a computer for quantitative data analysis and image display at full potential of signal. Allows true radiometric calibration including correction for non-linearity of AM modulation. Remote control of channel and gating output also available.

6. Price Information: From US$4,000

7. Delivery Schedule: 4-6 mosths ARO

8. Additional Comments: Software algorithm support and complete system procurement available.

Company Name and Address: Japan Radio- Co., Ltd.
Akasaka Twin Tower (Main)
17-22, Akasaka 2-chome
Minato-ku, Tokyo 107
JAPAN

Telephone Number: (03) 584-2482

Telex: 2425420 JRCTOK J

Japan Radio Co., Ltd. (A):

1. Equipment Type: APT ship board receiving station

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/APT

3. Equipment Trade Name/Model: JRC JCV-16E Oceanographic Color Display

4. Equipment Description: Receiving station including fixed turnstile antenna; image processing unit with VHF receiver and color monitor with operation panel and digital cassette deck. Indirect fishery equipment that provides an aid to finding fishing ground.

5. Special Features: Absolute surface temperature distribution; weather and navigational information; zooming of water area; on-line display of orbit data; automatic receiving and recording; event mark indication; on-line navigational and water temperature gauge.

6. Price Information: Basic composition; Yen 10,000,000 (Approx. US$56,000)

7. Delivery Schedule: Stock to 30 days

8. Additional Comments: It is often helpful for fishermen to have information on how the current flows in the sea where they are fishing. This is shown by temperature differences at the water surface, which you can now obtain from a meteorological satellite. The JCV-16E is designed to receive the APT signals and to display in color an absolute temperature distribution for a large water area. A latitude and longitude grid is displayed, along with your ship s position. Color printer options available.

9. Equipment Demonstration Locations: JRC Mitaka Plant
Mitaka City Tokyo
JAPAN

Jaoan Radio Ltd. (B):

1. Equipment Type: WEFAX/LR-FAX Ground Receiving Station

2. Equipment Used for the Following Satellites/Data Transmission: GOES/WEFAX, METEOSAT and GOMS; GMS/LR-FAX

3. Equipment Trade Name/Model: JRC JCV-16G

4. Equipment Description: Complete WEFAX (LR-FAX) ground receiving station including parabolic antenna, UHF/VHF downconverter, color display with digital cassette, image processing unit with IF receiver and color printer.

5. **Special Features: Real-time indication; 16 false-color display; animation indication, 8 sheets; capable of automatic receiving; built-in digital cassette deck; absolute temperature indication for IR image**

6. **Price Information: Basic composition, Yen 14,000,000 (Approx. US$78,000)**

7. **Delivery Schedule: 180 days**

a. **Additional Comments: Different recorder options available**

9. **Equipment Demonstration Locations: JRC Mitaka Plant**
Mitaka City Tokyo
JAPAN

Company Name and Address: **DELTRON International Trading Company***
Schutstraat 58
NL-7901 EE Hoogeveen
The NETHERLANDS

J. Doeven

Telephone **Number: 05280-68816**

Telex: 42775 delto

1. **Equipment Type: SATELLITEFAX 2271**

2. **Equipment Used for the Following Satellites/Data Transmission:** NOAA/APT, METEOSAT-1,2, METEOR

3. **Equipment Trade Name/Model: Deltronics**

4. **Equipment Description: Complete weather satellite receiving system with video output (black/white) and RGB color. Memory capacity: 3-megabit 512 pixels x 512 lines; 4 memories with memoryscan and time for -animation film" operation.**

5. **Special Features: Timer with animation film and "zoom" function**

6. **Price Information: 9650 Gilder (Approx. US$3,200); Parabolic antenna 1.20 meter with converter 2565 Gilder (US$850)**

7. **Delivery Schedule: 6 weeks**

8. **Additional Comments: Options: receiving converter GOES; 60** Hz, **125** VAC inbuilt **power supply**

9. **Equipment Demonstration Locations: Schutstraat 58**
Hoogeveen
THE NETHERLANDS

*DELTRON **is the manufacturing and wholesale department of** Doeven **Electronics**

Company Name-and Address: Compagnie Industrielle Radioelectrique
Bundesgasse 16
CH-3001 Berne
SWITZERLAND

Telephone Number: (031) 22'91'11

Telex: 911'877 CIRB

Compagnie Industrielle Radioelectrique (A):

1. Equipment-Type: Complete ground receiving station

2. Equipment Used for the Following Satellites/Data Transmission: METEOSAT/PDUS, NOAA/AVHRR, GMS/HRFAX, GOES; METEOSAT/WEFAX and NOAA/APT; METEOSAT/DCP

3. Equipment Trade Name/Model: JUPITER Combined Weather Satellite Receiving Station

4. Equipment Description: Complete ground receiving station for single or combined reception of geostationary and/or polar-orbiting weather satellites. The following subunits are available: parabolic antennas, tracking pedestal, tracking computer, LNA, downconverter, receiver, bit-synchronizer, frame-synchronizer-decommutator, DMA, image processor, laser telephoto recorder, computer-compatible tape recorder.

5. Special Features: Real-time image processing and recording of AVHRR pictures on dry silver paper, with and without zooming in full resolution.

6. Price Information: Depending on requested features and specific satellites. Price range beginning at approx. SFr. 600,000 (Approx. US$275,000)

7. Delivery Schedule: Approx. 9 to 15 months, depending on features requested.

8. Additional Comments: JUPITER combined weather satellite receiving stations are taylor-made according to customers specifications. Frame-synchronizer/decommutator available with DMA-interfaces far all current DEC-VAX computers. Image processing system available with Ethernet interface.

9. Equipment Demonstration Locations: CIR, Berne

Comoagnie Industrielle Radioelectriaue (B):

1. Equipment Type: Automatic laser telephoto recorder

2. Equipment Used for the Following Satellites/Data Transmission: Basic configuration for reception of WEFAX signals. Extension for APT and HRPT signals.

3. Equipment Trade Name/Model: SATFAX TM 4036

4. Equipment Description: SATFAX TM 4036 is a laser picture recorder allowing processing and recording of pictures providing good photographic quality from meteorologic satellites.

5. **Special Features: Processing comprises grey-scale manipulation (16 look up tables) real-time zooming of centre, left and right half of picture.**

6. Price Information: Basic configuration **approx. Sir. 75'000** (Approx. US$35,000); **Options on request.**

7. **Delivery Schedule: Approx. 4 to 9 months, depending on options.**

a. **Additional Comments:** SATFAX **TM 4036** is of modular design **and allows the subsequent extension with option for APT-Image reception, option for HRPT digital signals reception and timer-option for** pre-programming of image processing **and** sectors to be recorded.

9. Equipment Demonstration **Locations: CIR,** Berne

Company Name and Address; **S . A .**
Lugano Airport
6982 Agno
SWITZERLAND

Telephone Number: (91) 593402

Telex: 840009 TECN CH

Technavia, S.A. (A):

1. **Equipment** Type: Complete ground receiving stations for meteorological satellites

2. Equipment Used for **the Following** Satellites/Data **Transmission:** GOES/WEFAX; METEOSAT/WEFAX; GMS/LRFAX; **NOAA/APT; METEOR/APT**

3. **Equipment Trade** Name/Model: SKYCEIVER^{R}

4. Equipment Description: The system consists of the following items according to system capacity: parabolic antenna 1, 1.5, or 2 meter diameter, pedestal, S-band LNA downconverter, omnidirectional active VHF antenna, receiver(s) with outputs also for DCP reception, Laserfax image recorder, interface for **APT** hardcopy images, videoprocessor for hardcopy enhancement, gridding computer for orbiting satellites, automatic station management, RAM memory (4 to 32 **Mbytes and up) dedicated computer for storing** and color processing of images with output for direct hardcopy and/or **telephone line** and/or RS232.

5. Special Features: Complete ground receiving stations of modular con**cept APT to receive one or all meteorological satellites. All components from antennas to imaae** recorder, except monitors **and tape** recorder, are desianed and produced by **Tecnavia.**

Hardcopy images of photographic quality through Laserfax^{R} **image** recorder manufactured **by Tecnavia by agreement with** Harris Corporation **U.S.A.**

Softcopy images are stored and processed through dedicated computers, designed and manufactured by Tecnavia with high TAM capability achieving in this way maintenance-free features. Computers are supplied inclusive of a wide range of standard software; also customized software is available.

Processed images may be directly printed out on any suitable hardcopy recorder or retransmitted through telephone line to remote sites or loaded via RS232 to host computers or terminals.

For polar-orbiting satellites, gridding-capabilities are available.

6. Price Information: Complete station (including hardware mounting) ranges from US$14,000 to over US$150,000

7. Delivery Schedule: 1-4 months according to type of requirements and back-log of orders

8. Additional Comments: Our equipment is designed to be cost-effective, maintenance-free, although highly professional, easy to operate, It is conceived to be a day-to-day tool for the meteorologist and is adopted by many research institutes because of its professional features.

9. Equipment Oemonstration Locations: Installed in over 40 countries around the world at national met centers, on-board ships, research centers, airports, airlines, universities, TV broadcasting stations, etc. Contact us for information on closest station to see.

Technavia S.A. (a):

1. Equipment Type: Complete front-end digital receiving equipment

2. Equipment Used for the Following Satellites/Data Transmission: METEOSAT/PDUS, GOES/Mode-AAA, GMS/HRFAX, NOAA/HRPT

3. Equipment Trade Name/Model: SKYCEIVER DIG (PDUS, etc.)

4. Equipment Description: Parabolic antenna from 3 to 6 meters plus pedestal, S-band downconverter, digital receiver with multiple num bit synchronizer

5. Special Features: Multiple simultaneous and independent outputs from single multifrequency receiver (i.e., 5 outputs on METEOSAT: PDUS, 2 channels SDUS, 2 channels DCP).

6. Price Information: From US$35,000 for a complete METEOSAT frontend using a 4-meter dish.

7. Delivery Schedule: Oelivery from 3 to 4 months according to type of equipment and back-log of orders

8. Additional Comments: none

9. Equipment Demonstration Locations: Switzerland (Met Office) and Sweden to this date

Technavia S.A. (C):

1. Equipment Type: Dedicated high-capacity RAM memory computer terminals for image storing and processing of satellite imagery and radar imagery

2. Equipment Used for the Following Satellites/Data Transmission: Equipment used for all meteorological satellites and radar images with digital or analog input, with storage capacity from 4 to over 32 Mbytes without floppy disks or hard disks.

3. Equipment Trade Name/Model: SKYCEIVER^{R} 6, SKYCEIVER^{R} 9, and SARA (which also includes RADAR imagery).

4. Equipment Description: Solid state computer mounted in a floor console or table rack, relative monitor and keyboard including joystick can be also located at a distance of up to 30 meters.

5. Special Features: Mass storage capacity of over 32 Mbytes obtained on RAM without any hard disk. Exceptional high operational speed thanks to multi-microprocessing and multiple lookup tables.

6. Price Information: From US$12,000 up complete with wide choice of software programs.

7. Delivery Schedule: From stock or up to 4 months according to backlog of orders

8. Additional Comments: Features and programs included in our computers were carefully studied together with meteorologists according to operative and research needs. Solid state memories and no mechanical parts permit high MTBF. Customized programs are available.

9. Equipment Demonstration Locations: Installed in many countries around the world.

Comoany Name and Address: **Feedback Instruments Limited**
Park Road
Crowborough
East Sussex TN6 2QR
ENGLAND

Mr. Philip Rowland Smith

Telephone Number: 08926 3322

Telex: 95255

Feedback Instruments Limited (A):

1. **Equipment Type: Meteorological satellite ground station**

2. **Equipment Used for the Following Satellites/Data Transmission: APT and** WEFAX

3. **Equipment Trade Name/Model: WSR513 (APT only), WSR513 Plus WSR515** (APT **and** WEFAX)

4. **Equipment Description: Ground station for the reception of APT** data **from NOAA and** METEOR-2 **series of polar-orbiting satellites and** WEFAX **data from geostationary satellites such as** GOES, METEOSAT, GMS AND GOMS.

5. **Special Features: A low-cost system including** colour **enhancement/density slicing, video output suitable for standard** video **tape recorder. Optional modules for linking to audio tape** recorder **and interfacing with microcomputers.**

6. **Price Information: Depending on options the price range for** complete **systems is 5,000 Sterling** (US$6,500) **to 6,800 Sterling** (US$9,200) **excluding** ancilliary **equipment.**

7. **Delivery Schedule: 12 weeks**

8. **Additional Comments: Audio tape recorders, hard-copy devices, etc., are available upon request. Equipment supported by AT agents world-wide, on-site training and installation available.**

9. **Equipment Demonstration Locations: Contact Feedback's UK Office** for **details of local agent and existing users.**

Feedback Instruments Limited (B):

1. **Equipment Type: Meteorological satellite ground station**

2. **Equipment Used for the Following Satellites/Data Transmission:** NOAA6 **onwards** (TIROS/N **series): APT**

3. Equipment **Trade Name/Model:** WSR 524

4. Equipment Description: **Ground station for** the **reception of** APT data **from** TIROS/N **series of polar-orbiting** satellites

5. Special Features: Very low-cost; automatic acquisition and storage of latest visible andinfra-red images; automatic overlay of latitude-longitude grid and ground station marker; post-reception user control of IR/VIS image cross-fade; output to video monitor or TV receiver and via computer port.

6. Price Information: Basic unit around US$1,600 without display device. Some options available or under development - current status on request.

7. Delivery Schedule: 12 weeks maximum, typical 6 weeks

8. Additional Comments: Equipment supported by own agents in most countries. On-site training and installation available.

9. Equipment Demonstration Locations: Contact Feedback's UK Office for information on agents and existing users.

Feedback Instruments Limited (C):

1. Equipment Type: Meteorological satellite ground station

2. Equipment Used for the Following Satellites/Data Transmission: METEOSAT: PDUS

3. Equipment Trade Name/Model: Not determined

4. Equipment Description: Low-cost receiver for the Digital Primary Data Transmissions from METEOSAT.

5. Special Features: Purpose-designed receiver employing modern techniques.

6. Price Information: Within the range US$15,000 to US$40,000

7. Delivery Schedule: Available mid-1987

8. Additional Comments: Can provide a PDUS capability for users of existing image-processing facilities.

Comoany Name and Address: Alden Electronics, Inc.
40 Washinqton Street
Westborough, MA 10581
USA

Lawrence A. Farrington
Vice-President

Telephone Number: (617) 366-8851

Telex: 94-8404

1. Equipment Type: High-resolution meteorological ground station.

2. Equipment Used for the Following Satellites/Data Transmission: NOAA ATN (Advanced TIROS-N)/HRPT(AVHRR) and DSB(TOVS);METEOSAT/PDUS and SDUS (WEFAX); GMS/HRFAX; GOES/VAS Mode-A and Mode-AAA; GOES/WEFAX

3. Equipment Trade Name/Model: Alden High-Resolution Meteorological Satellite Ground Receiving System

4. Equipment Description: Complete ground station for the reception of data from NOAA/HRPT, METEOSAT/PDUS, GMS/HR-FAX and GOES/VAS. Simultaneous reception of data and storage on hard disk memory allows rapid retrieval of images for looping and data manipulation. Antennas, LNA, downconverters and receivers provide data to the computer processor system.

5. Special Features: Interactive work stations provide looping, color enhancement, overlay of graphics and satellite images, zoom, pan and scroll, split-screen, numeric readout cursors and manual drawing ar' editing of graphics. Remote monitors and hard copy facsimile recorders. Functional modular design allows system configuration to best meet present and future needs.

6. Price Information: US$350,000 to US$2,000,000 depending on specifics of satellite reception, computer system and data display networks.

7. Delivery Schedule: 9 months to 1 year

8. Additional Comments: The Alden HRPT systems image processing capabilities are based on the Alden Satellite Weather Information System (SWIS) developed for the U.S. National 'Weather Service. Alden Model 9740 and 9730 Facsimile Processors allow reception of and distribution of facsimile signal for networking.

9. Equipment Demonstration Locations: Alden Electronics
Westborough, Massachusetts
USA

Company Name and Address: Alden International,- Inc.
40 Washington Street
Westboro, MA 01581
USA

Mr. Ralph Binney

Telephone Number: (617) 366-8851

Telex : 200192

Alden International, Inc.(A):

1. Equipment Type: Complete color weather satellite ground receiving system with WEFAX option.

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/APT; METEOR/APT; GOES-E,-W and Central/WEFAX;METEOSAT/WEFAX; GMS/LR-FAX

3. Equipment Trade Name/Model: Alden APTS-4A

4. Equipment Description: This modular system includes color weather satellite picture processing and display; omni-directional VHF antenna with built-in VHF preamplifier, satellite telemetry receiver, operator's control center with console desk, video terminal; precision facsimile tape recorder, Alden weather satellite recorders. Options include automatic latitude/longitude grid generator, photo recorder, WEFAX capability.

5. Special Features: Color graphics system configured for enhancement, contouring and color display of satellite pictures plus grey scale, 64-level. Operator functions include picture scroll, zoom (7 selectable from 16:1 to 1:1/4), looping (animation) of GOES pictures and sectorization. Disk storage 45 frames, RAM storage 6 frames.

6. Price Information: Pricing US$50,000 and up depending on options selected; spare parts, installation and training services desired; CIF charges, duties and fees.

7. Delivery Schedule: 60-90 days

8. Additional Comments: Alden has provided satellite receiving systems since 1964 with equipment installed in over 100 countries. Alden serivces can include site surverys; installation, installation supervision; turnkey meteorological station projects; training in maintenance and operation; foreign language manuals, training; deport and field maintenance spare parts and spare parts kits; training services in analysis of weather satellite pictures.

   Alden systems are available packaged for shipboard and mobile use and for installation into vehicles or instrumented shelters. Portable and lightweight systems furnished for field use, are available with carrying cases and power packs.

   Alden weather satellite receiving Systems can interface directly to customer's existing central computer system for processing with other graphic/alphanumeric products or can feed communications centers for subsequent distribution of satellite pictures via standard voice grade channels.

9. Equipment Demonstration Locations: Alden always has live equipment and systems demonstrations when participating in overseas and U.S. exhibits. The current Alden Exhibit Schedule may be obtained by writing directly to:

Alden International, Inc.
40 Washington Street
Westboro, Massachusetts 01581
USA

Alden International, Inc. (B):

1. Equipment Type: Complete APT weather satellite ground receiving system with WEFAX option

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/APT; METEOR/APT; GOES-E, -W and Central/WEFAX; METEOSAT/WEFAX; GMS/LR-FAX

3. Equipment Trade Name/Model: Alden APTS-3B

4. Equipment Description: This modular system includes omni-directional VHF antenna with built-in preamplifier, satellite telemetry receiver, operator's control center, precision facsimile tape recorder, rack-mounted Alden weather. satellite recorder. Options include alternate HF radiofacsimile receive capability, automatic latitude/longitude grid generator, WEFAX reception capability. System provides rack space for customer provided equipment.

5. Special Features: Analog recording features, dual-bay configurations simplify maintenance and access. VHF omni-directional antenna for unattended reception; precision facsimile tape recorder can drive telephone line network of remote satellite recorders; Alden recorders provide expanded or side-by-side IR/VIS presentation.

6. Price Information: Pricing US$25,000 and up depending on options selected; spare parts, installation and training services desired; CIF charges, duties and fees.

7. Delivery Schedule: 60-90 days

8. Additional Comments: See (A)

9. Equipment Demonstration Locations: See (A)

Alden International, Inc. (C):

1. Equipment Type: Complete APT weather satellite ground receiving system with WEFAX option

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/APT; METEOR/APT; GOES-E,-W and Central/WEFAX; METEOSAT/WEFAX; GMS/LR-FAX

3. Equipment Trade Name/Model: Alden APTS-3C

4. Equipment Description: This modular system includes omni-directional VHF antenna with built-in satellite telemetry receiver, console and operator's control center, precision facsimile tape recorder (ree-to-reel or cassette), Alden weather satellite recorder. Various options include color picture processing and display, automatic latitude/longitude grid generator, photo recorder, WEFAX reception capability.

5. Special Features: VHF omni-directional antenna for unattended reception; precision facsimile tape recorder can drive telephone line network of remote satellite recorders on CRT displays. Alden recorder contains 32 standard enhancement curves, provides expanded or side-by-side IR/VIS presentaiton, date/time printout.

6. Price Information: Pricing US$30,000 and up depending on options selected; spare parts, installation and training services desired; CIF charges, duties and fees.

7. Delivery Schedule: 60-90 days --

8. Additional Comments: See (A)

9. Equipment Demonstration Locations: See (A)

Alden International, Inc. (D):

1. Equipment Type: Compelte WEFAX(SDUS) Receiving System - Portable

2. Equipment Used for the Following Satellites/Data Transmission: GOES-E,-W and Central/WEFAX;METEOSAT/WEFAX;GMS/LR-FAX

3. Equipment Trade Name/Model: Alden WEFAX 35

4. Equipment Description: System includes 1.2 m (4 ft) or 1.8 m (6 ft) diameter parabolic antenna with simple, quickly set up stand, RF coax cable, Alden recorder with built-in telemetry receiver. Designed as a lightweight, portable system, the 3T can be installed in the most space-limited office, van or shelter.

5. Special Features: Capable of automatic operation, the 3T is designed for tactical applications and is furnished with a 1.2 m (4 ft) diameter parabolic antenna or optional, a 1.8 m (6-ft) antenna. The antenna stand is an elevation-over-azimuth type, simple to set up. An installation kit is included with all necessary parts and tools for installation.

6. Price Information: Pricing US$15,000 and up depending on options selected; spare parts, installation and training services desired; CIF charges, duties and fees.

7. Delivery Schedule: 60-90 days

8. Additional Comments: See (A)

9. Equipment Demonstration Locations: See (A)

Alden International, Inc. (E):

1. Equipment Type: Complete WEFAX(SDUS) Receiving System

2. Equipment Used for the Following Satellites/Data Transmission: GOES-E,-W and Central/ WEFAX; METEOSAT/ WEFAX; GMS/LR-FAX

3. Equipment Trade Name/Model: Alden WEFAX 1100

4. Equipment Description: System includes 1.8 m (6 ft) or 2.4 m (8 ft) diameter parabolic antenna with mount, universal stand, RF coax cable, microwave preamplifier, UHF/VHF downconverter, telemetry receiver, Alden recorder. Oesigned for permanent or semi-permanent station installation.

5. Special Features: Triplexer-based downconverter permits master oscillator to be maintained at room temperature for greater precision, elimination of retuning. Telemetry receiver provides selectable IF bandwidth for GOES, METEOSAT and GMS operation; 1691.0 and 1694.5 MHz receive frequencies for METEOSAT.

6. Price Information: Pricing US$19,000 and up depending on options selected; spare parts; installation and training services desired; CIF charges, duties and fees.

7. Delivery Schedule: 60-90 days

8. Additional Comments: See (A)

9. Equipment Demonstration Locations: See (A)

Company Name and Address: o r S y s t e m s
502 Office Center Drive
Fort Washinton, PA 19034
USA

Mr. Richard J. Margraff
Marketing Manager, Standard Products

Telephone Number: (215) 646-8100

Telex: 173185

Aydin Monitor Systems (A):

1. Equipment Type: Single-bit-rate bit synchronizer

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/HRPT

3. Equipment Trade Name/Model: Model 353 single-bit-rate bit synchronizer with SBR-353-6.654 x 10^5 bps

4. Equipment Description: A fixed-rate, high-performance PCM bit synchronizer supplied at 665.4 kbps (HRPT) which reconstructs the serial data stream in the presence of noise and generates a 0^0 clock which is synchronized to the incoming data.

5. Special Features: Bit-error probability within 1.5 dB of theory for any Eb/No $\geq$ +5 dB.

6. Price Information: None Available

7. Delivery Schedule: 120 days ARO

8. Additional Comments: Used in system configuration with Model 442 NOAA/HRPT format synchronizer.

9. Equipment Demonstration Locations: Aydin Monitor Systems
Fort Washington, PA 19034
USA

Aydin Monitor Systems (8):

1. Equipment- Type: NOAA/HRPT format synchronizer

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/HRPT

3. Equipment Trade Name/Model: Model 442 HRPT format synchronizer

4. Equipment Description: Synchronizes and decornmutates NOAA/HRPT format and provides suitable outputs to digital computers and laser fax recorders.

5. Special Features: a) internal simulator generates data patterns of continuous greyscale of 16-step grey scale in either horizontal or vertical direction; b) various output data ports for AVHRR and TIP data, suitable for interface to DEC PDP/11 series computers; c) four selectable algorithms for data enhancements.

6. Price Information: None Available

7. Delivery Schedule: 120 days ARO

8. Additional Comments: Used in system configuration with Model 353 single-bit-rate synchronizer.

9. Equipment Demonstration Locations: Aydin Monitor Systems
502 Office Center Drive
Fort Washington, PA 19034
USA

Aydin Monitor (SS) Systems:

1. Equipment Type: Receive subsystem (GOES/Mode-AAA)

2. Equipment Used for the Following Satellites/Data Transmission: GOES/Mode-AAA

3. Equipment Trade Name/Model: Model 1050 Receive subsystem

4. Equipment Description: Total receive subsystem with PSK demodulator, bit synchronizer and frame Synchronizer to process new Mode-AAA format for GCES weather data. Outputs are 13 GOES-BUS signals.

5. Special features: Single unit construction, functions optional parallel outputs suitable for computer interfacing, available on special quotation basis. Test modulator available as an option. Accepts signals as low as -60 dBm.

6. Price Information: None Available

7. Delivery Schedule: 120 days ARO

8. Additional Comments: Processes new Mode-AAA format and GOES-NEXT (1990)

9. Equipment Demonstration Locations: Aydin Monitor Systems
502 Office Center Drive
Fort Washington, PA 19034
USA

Company Name and Address: Datron Systems, Inc.
200 West Los Angeles Avenue
Simi Valley, CA 93065
USA

Norman L. Hannon
Director, International Operations

Telephone Number: (805) 584-1717

Telex: (910) 494-2787

1. Equipment Type: Satellite tracking antennas and receiving systems

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/HRPT

3. Equipment Trade Name/Model: Metrack-8

4. Equipment Description: 2.4 m (8-ft) tracking antenna and control system. Standard Metrack-8 features automatic track and computer interface (IEEE-488 or RS-232). Optional program track computer is available.

5. Special Features: Very high G/T (greater than +7.0 dB/kelvin) in a compact system. Antenna positioner is Military Grade (MIL-E-16400) for long, trouble-free life.

6. Price Information: 1) Basic system, US$200,000; 2) Optional program track computer US$25,000

7. Delivery Schedule: 8 months or better

8. Additional Comments: none

9. Equipment Demonstration Locations: Datron's facility; Oslo, Norway; Sondrestrom Fjord, Greenland; Beijing, PRC; Kuala Lumpur, Malaysia; Buenos Aires, Argenina; NASA GSFC, Greenbelt, Maryland, USA; NORDAY Ba St. Louis, Mississippi, USA; Jakarta, Indonesia; Stockholm, Sweden; Ottawa, Canada.

Company Name and Address:
P. O. Box 2214
North Mankato, MN 56002-2214
USA

Mr. Loren Johnson

Telephone Number: (507) 625-3624

1. Equipment Type: Facsimile Display System

2. Equipment Used for the Following Satellites/Data Transmission: GOES/(WEFAX, charts, images, TBUS); NOAA/(APT, VIS and IR); GMS/(Images-WEFAX); METEOSAT/(Images-WEFAX)

3. Equipment Trade Name/Model: ESC-102

4. Equipment Description: The system consist of a single plug in board, with software for the IBM-PC and compatibles that will display APT, WEFAX and Weather MAP data.

5. Special Features: Image acquision from audio signal; disk storage of images; printer support

6. Price Information: US$1,545 for ESC-102 board and software

7. Delivery Schedule: Stock to 90 days; beginning 1st quarter, 1986

8. Additional Comments: Currently supports tecmar graphics master in 640 x 400, 16 levels of gray and 16 colors. Will Support IBM(EGA) extended graphics adapter format.

9. Equipment Demonstration Locations: Electra-Services, by appointment

Company Name and Address: Fairchild Weston Systems, Inc.
P. 0. Box 3041
Sarasota, FL 33578
USA

0. J. Strock
Sr. Applications Engineer

Telephone Number: (813) 377-5563

Telex : 052-890

1. Equipment Type: Bit synchronizers, format synchronizers, data buffers, computer interfaces for satellite data

2. Equipment Used for the Following Satellites/Data Transmission: GOES/Mode-AAA, DMSP, NOAA, Shared METSAT

3. Equipment Trade Name/Model: EMR 8000 Series

4. Equipment Description: All the necessary synchronization and recognition which is required for weather satellite data.

5. Special Features: Modular, expandable tb cover new formats or variations

6. Price Information: US$40,000 to US$75,000 per data stream, except that DMSP runs US$100,000 to US$150,000

7. Delivery Schedule: Typically, 6 months

8. Additional Comments: none

9. Equipment Demonstration Locations: Sarasota, Florida
USA

Comoany Name and Address: Feedback, Inc.
620 Springfield Avenue
Berkeley Heights, NJ 07922
USA

Telephone Number: (201) 464-5181

Telex: 833231

1. Equipment Type: Meteorological satellite ground station

2. Equipment Used for the Following Satellites/Data Transmission: WEFAX

3. Equipment Trade Name/Model: WSR525

4. Equipment Description: Ground station for the reception of LR FAX or SDUS data form the geostationary series of weather satellites such as GOES, METEOSAT, GMS and GOMS

5. Special Features: A low-cost multiplexed receiver that is computer controlled with software developed with the cooperation of the British Meteorological Office. Thirty sectors may be stored and there is an automatic sequencing facility

6. Price Information: Dependent on options required the price range is US$2,000 to US$22,000

7. Delivery Schedule: 12 weeks

8. Additional Comments: The system may be linked to an additional computer. Also, the video output is suitable for television broadcasting when the optional Genlock module is utilized

9. Equipment Demonstration Locations: Contact Feedback's UK Office for details of local agent and existing users--telephone 08926 3322.

Comoany Name and Address: FG Engineering Co
Box 476, Hwy 89A
Fredonia, AZ 86022
USA

Fred Griswold
President

Telephone Number: (602) 643-7375

Telex: Unknown

1. Equipment Type: Receiving systems, environmental satellite

2. Equipment Used for the Following Satellites/Data Transmission: Satellites: NOAA, METEOR, GOES, METEOSAT. Data: APT, TIP, HRPT WEFAX, VISSR, DCS

3. Equipment Trade Name/Model: FG-700; FG-7100; FG-7200

4 . Equipment Description: The FG-701 and FG-702 drive a facsimile machine or computer display system with no additional equipment, and no set-up or tuning. Simple plug it in and get imagery. This is a quality and reliable unit in a rugged, weatherproof, pressurized housing. It will withstand severe environmental conditions. Computer programmable for channel, bandwidth, and demodulation selection. The complete receiver, including the LNA, is integrated into a single weather proof, nitrogen-pressurized, cast aluminum housing that mounts onto the antenna.

The FG-7100 and FG-7200 series receiving systems consist of a rack-mounted receiver, a VHF antenna and preamp and a parabolic antenna with downconverter. The receiver consists of a mainframe with removable modules. Additional capability is obtained by adding modules.

5. Special Features: The FG-700 series systems are dedicated to specific functions and are inexpensive, easy to install and operate and will withstand severe environmental conditions.

The FG-7100 series receive a combination of functions and are modular and expandable.

The FG-7200 series are capable of multiple and simultaneous reception of functions. They are also modular and expandable and can be cross-connected with other systems for redundancy.

6. Price Information: US$2500 to US$12,500 depending upon configuration and options.

7. Delivery Schedule: Stock to 120 days, depending upon options

8. Additional Comments: Individual requirements determine the choice of these three configurations. The FG-700 is a economical, dedicated system. The FG-7100 gives a choice of multiple functions in a single system. The FG-7200 provides both dedicated reception of a primary service and simultaneous reception of a choice of other multiple functions.

9. Equipment Demonstration Locations.: FG Engineering Co. facility and at various meterological conventions as announced.

Company Name and Address: Hamtronics, Inc.
65 Moul Rd
Hilton, NY 14468
USA

Telephone Number: (716) 392-9430

Telex : none

1. Equipment Type: Wideband FM receiver module

2. Equipment Used for the Following Satellites/Data Transmission: 137 MHZ band

3. Equipment Trade Name/Model: R75A-137

4. Equipment Description: Dual-conversion FM receiver module, crystal-controlled. Basic unit, single-channel. Five channel adapter -available.

5. Special Features: Sensitivity: 0.2 µV; Selectivity: ±17 kHz; Size: 10.2 x 10.8 cm PC board (no cabinet)

6. Price Information: Add US$3.25 for shipping and handling

Weather FAX Receiver:

R75A-137 VHF FM Receiver (single-channel), Kit US$98, Wired/tested US$178
R75A-137 with A14R5 Channel Adapter, Kit US$112, Wired/tested US$205
Crystals (specify channel frequency), US$8 each

R76-135-4 Data Receiver:

R76-135-4 Receiver (single channel), Kit US$148, Wired/tested US$218
R76-135-4 with A24-76 Five Channel Adapter, Kit US$162, Wired/tested US$253
Crystals (specify channel frequency), US$8 each

7. Delivery Schedule: Stock

a. Additional Comments: Ideal companion for Microcomm S-band downconverter as well as direct 137 MHz reception

9. Equipment Demonstration Locations: Not available

Company Name and Address: Harris Corporation
Government Information Systems Division
P. O. Box 98000
Melbourne, FL 32902
USA

V. P. Hart, Jr.
Program Manager, Laserfax

Telephone Number: (305) 727-6200

Telex: 56-8432 HESRADAMELB
TWX: 510-959-6006 HRSRODESMELB
FAX: 242-4343 or 242-4245

1. Equipment Type: Facsimile recorder

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/APT; GOES/WEFAX; METEOSAT

3. Equipment Trade Name/Model: Laserfax, Model 850 Transmitter and Model 850 Recorder

4. Equipment Description: The Harris Laserfax Model 850 Recorder is a photographic-quality facsimile recorder designed for the recording the high-quality weather photographs from NOAA, SMS/GOES and METEOSAT series of weather satellites. The recorder operation is fully automatic with either dry silver paper or the optional dry silver film.

5. Special Features: The Laserfax Model 850 has a switch selectale positive or negative image capability. The equipment provides continuous-tone photographic-quality output using dry silver paper or dry silver film.

6. Price Information: FOB-Melbourne, Florida

850 transmitter (paper and film capable) = US 500
850 recorder (paper) = us 15,900
850 recorder (film) = US$ 16,100

7. Delivery Schedule: PO days after receipt of order (ARO)

8. Additional Comments: The Laserfax Transmitter and Recorder are ideally suited to weather forecasting network. Ease of operation and exceptional reliability and maintainability have been designed into the equipment. Over twenty distributors are located world-wide for logistical suport in additional to that from the factory.

9. Equipment Demonstration Locations: Contact Laserfax in Melbourne, Florida at above address or telephone for the name and address of the nearest distributor.

Company Name and Address: International Systems and Software, Inc.
Rt. 1, Box 239
Crestview, FL 32536
USA

Telephone Number: (904) 682-2506

Telex : Unknown

1. Equipment Type: Transparent film grid (TFG) overlays for the NOAA-series polar-orbiting meteorologic& satellites. Each transparent film grid package is tailored to accommodate the display product produced by the users display device.

2. Equipment Used for the Following Satellites/Data Transmission.: Transparent film grids can be sized to acommodate almost any display device. Transparent grids are currently being produced for the Harris 850, Alden 9811, Muirhead K-560 and UPI Unifax II. The grids supply latitude and longitude coordinates for images obtained from NOAA-6, NOAA-8 and NOAA-P. A separate grid is required for each satellite.

3. Equipment Trade Name/Model: AFT transparent film grid (TFG) for NOAA series polar-orbiting satellites.

4. Equipment Description: The TFG overlays are designed to be placed directly over the display image. The user can then associate areas of interest on the image with latitude/longitude points contained on the grid. Each grid set consists of 10 chart sets (5 Ascending and 5 Descending). Each chart set provides a grid 28.7 degrees wide (longitude) by PO degrees long (latitude).

5. Special Features: The TFG provides an accurate, low cost, easy to use method of assigning position information to data contained on a display image. The software used to generate each TFG uses current satellite EPOCH parameters as inputs.

6. Price Information: US$250

7. Delivery Schedule: Usually within 30 days after receipt of order.

8. Additional Comments: Each TFG contains up to 60 transparent film sheets depending upon the size of the image produced by the display device.

In order to supply the appropriately-scaled grid, ISSI must be supplied with the following information:

a) Manufacturer and model number of display device
b) Display image size
c) Number of satellite from which data is being received (NOAA-6,8, or 9)

It is beneficial to supply ISSI with an image (containing landmarks) from the display device. ISSI will use the image supplied to-verify that the proper scalling is applied to the grid prior to mailing the grid to the user.

9. Equipment Demonstration Locations: The ISSI grids are currently used by U. S. government installations, U.S. military installations, U.S. private industry and foreign governments.

10. Additional Support: ISSI is qualified to provide system engineering and software support to installations in need of such assistance.

Company Name and Address:
P. O. Box 739.
Burlington, MA 01803-5739
USA

Telephone Number: (617) 272-3265

Telex: None

1. Equipment Type: Satellite signal processor

2. Equipment Used for the Following Satellites/Data Transmission: GOES, NOAA, METEOR, METEOSAT, GMS

3. Equipment Trade Name/Model: Model 145, satellite signal processor - scan converter

4. Equipment Description: Automatically recognizes TIROS-N, WEFAX,GOESFAX, METEOSAT, GMS/LR, METEOR-120 and permits presentation of signals for instantaneous recording. Provides for the preprocessing and automatic operation of modified recorders such as: LASERFAX 850 MARK II, UP1 UNIFAX II, Muirhead K-560 and K-300.

5. Special Features: Provides corrective level compensation so that TIROS-N images may be recorded either side-by-side or single channel expanded. Each scan is subdivided into 2048 pixels and stored in a buffer memory. Data is retrieved at a rate of 360 scans/minute and recorded three times for each scan to compose a denser image.

6. Price Information: US$8,300 - US$10,250, depending on options such as computer, HRPT or gridder interfaces.

7. Delivery Schedule: 90 days ARO

8. Additional Comments: Model 145 is ideally suited to upgrade WEFAX recorders to polar-orbiting satellites, TIROS and METEOR.

The processor has been integrated in ground receiving stations made by some major systems manufacturers.

9. Equipment Oemonstration Locations: Burlington, MA USA

Comoany Name and Address: METSAT, Inc.
515 South Howes
Fort Collins, CO a.0521
USA

Mr. David Cismoski

Telephone Number: (303) 221-5420

Telephone Number: None

1. Equipment Type: Frame synchronizer for the VAS Mode-AAA data transmission- from GOES satellites.

2. Equipment Used for the Following Satellites/Data Transmission: The equipment is used for receiving the VAS Mode-AAA data slated for operation in September, 1986.

3. Equipment Trade Name/Model: METSAT Frame Synchronizer Model 11.

4. Equipment Description: The equipment consists of frame synchronizer hardware and software designed for the VAS Mode-AAA data transmission from GOES satellites. The hardware consists of the frame synchronizer, display and data simulator for diagnostic evaluation on the total system. The hardware drives the bus on Digital Equipment Corporation computers, and software is included for completing data ingest into the computer.

5. Special Features: The frame synchronizer includes a data simulator that allows the system performance to be evaluated independent of satellite transmission. By generating a known image, system integrity can rapidly be assessed. The display shows the sixteen-bit frame check sequence which is an indication of data quality. The software allows autonavigation, calibration and selection of specific sectors as part of the injest.

6. Price Information: *

a. Frame synchronizer hardware, including chasis, power supply, and display	US$20,000
b. Data simulator	US$ 10,000
c. Basic OEC software	US$ 5,000
d. Autonavigation and calibration	US$ 5,000
e. Sector select	US$ 2,000

*Prices are subject to change without notice. Prices depend on the overall system configuration where the equipment will be used.

7. Delivery Schedule: Items a,b,and c will be available 1 September 86. Items 4 and 5 will be available the first quarter of 1987.

8. Additional Comments: The system was designed to operate with all DEC computers using the VMS operating system and capable of handling the word transfer rate to mass Storage. METSAT, Inc. must know the system configuration that the frame synchronizer is to be integrated into before definite quotes on cost can be generated.

The frame syncronizer is a necessary piece of equipment if VAS Mode-AAA transmissions are to be decoded.

9. Equipment Demonstration Locations: 515 South Howes
Fort Collins, Colorado 80521
USA

Company Name and Address: Metsat Products, Inc.
1257 Glen Meadow Lane
E. Lansing, MI 48823
USA

Edward L. Klewicki

Telephone Number: (517) 332-4317 or (517) 332-7665

Telex: Unknown

Metsat Products, Inc. (A):

1. Equipment Type: APT or WEFAX image display scan converter

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/APT; (120 lpm or 240 lpm modes), METEOR/APT (120 lpm and 240 lpm); GOES/WEFAX; METEOSAT/WEFAX; GMS/WEFAX

3. Equipment Trade Name/Model: Model 1500

4. Equipment Description: The Model 1500 is a multi-mode, computer-controlled,scan converter that permits display of all APT and WEFAX image products on a standard television monitor or TV display. Images are displayed in a 256 x 256 format with 16 gray-scale shades.

5. Special Features: The 1500 supports completely automatic WEFAX display, inversion of the displayed image, contrast enhancement, high-resolution imaging, and false-color dislay. The system includes the display unit, computer and complete software in EPROM. The computer may be used for other purposes when not involved in display.

6. Price Information: US$1,400

7. Delivery Schedule: Stock to 90 days

a. Additional Comments: The Model 1500 has a single image memory, supports both "live" and taped (audio) imagery, and permits digital image storage to tape or disk. The Model 1600 has three image memories, 256 x 240 resolution, and 64 gray-scale shades with an extremely wide range of additional operating features. The Model 1700 is similar to the 1600 but features 512 x 480 line resolution. The Model 665 is a dedicated (no computer) unit that provides basic APT, WEFAX and HR FAX display. Contact the factory for detailed descriptions and pricing on these products.

9. Equipment Demonstration Locations: By special arrangement

Metsat Products (B):

1. Equipment Type: 1.7 GHz Parabolic Antenna System

2. Equipment Used for the Following Satellites/Data Transmission: GOES/WEFAX; METEOSAT/WEFAX

3. Equipment Trade Name/Model: GA-4

4. Equipment Description: 1.2 m spun-aluminum parabolic reflector; center-mounted (air-dielectric support/feedline) with weatherproof, O-ring sealed feed horn; type-N coaxial output.

5. **Special Features:** The GA-4 provides a compact, light-weight antenna system that provides ample signal-margin in GOES and METEOSAT WEFAX service when used in conjunction with Metsat downconverter systems.

6. Price Information: US$550

7. Delivery Schedule: Stock to 90 days

8. Additional Comments: The GA-4 is provided with hardware for elevation-azimuth mounting on a simple vertical pipe mast from 3 to 10 cm in diameter. The antenna can be adjusted for vertical or horizontal polarization and may be mounted on a polar axis if desired to track the entire geostationary (Clark) belt.

9. Equipment Demonstration Locations: By special arrangement.

Metsat Products (C):

1. Equipment Type: Omni-directional VHF Antenna

2. Equipment Used for the Following Satellites/Data Transmission: 136-138 MHz VHF

3. Equipment Trade Name/Model: TA-5

4. Equipment Description: 4-element turnstile array with intergral low-noise VHF preamplifier; output connector SO-239; RG8 or RG58 coaxial cable; power requirements +12 VDC supplied by the station receiver through the transmission line.

5. Special Features: Permits reception of polar-orbit NOAA/APT and METEOR/APT signals to within 5° of the horizon without the need for tracking.

6. Price Information: US$375

7. Delivery Schedule: Stock to 90 days

8. Additional Comments: Use of the TA-5 permits unattended reception of polar-orbit APT imagery using a simple timer. Suitability for use with other types of VHF satellite transmissions dependent on spacecraft ERP, signal bandwidth and receiver specifications.

9. Equipment Demonstration Locations: By special arrangement

Metsat Products (D):

1. -Equipment Type: 1.7 GHz/136-138 MHz downconverter

2. Equipment Used for the Following Satellites/Data Transmission: GOES/WEFAX; METEOSAT/WEFAX; GMS/WEFAX

3. Equipment Trade Name/Model: GOC-5

4. Equipment Description: 1691.0 or 1694.5 MHz (switch-selectable) to 137.5 MHz downconverter to provide GOES reception on receivers designed for FM reception on the 136-138 MHz VHF satellite band; type-N input connector; integral RF preamplification, signal conversion, and IF (VHF) preamplification; Type-@NC output.

5. Special Features: Weather-resistant cast-aluminum case; converter is powered (+12 VDC) through the IF transmission line-from the receiver; provision for remote switching between the 1691.0 and 1694.5 MHz input frequencies.

6. Price Information: US$500

7. Delivery Schedule: Stock to 90 days

8. Additional Comments: Normally the GDC-5 converter-is mounted at the antenna but the converter can be mounted indoors at the receiver with the use of the optional GPA-5 preamplifier, available in a weather-proof case for US$200

9. Equipment Demonstration Locations: By special arrangement

Metsat Products (E):

1. Equipment Type: Multi-channel VHF FM receiver

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/APT; METEOR/APT; GOES/WEFAX; METEOSAT/WEFAX with suitable downconverter.

3. Equipment Trade Name/Model: GR-5

4. Equipment Description: The GR-5 is a dual-conversion, ll-channel crystal-controlled FM receiver designed for APT and WEFAX reception in the 136 to 138 MHz range. The unit is powered from +12 VDC and is suitable for portable use.

5. Special Features: The receiver features a constant peak output level port independent of the volume control; monitor speaker; squelch control; channel selector; +12 VDC is supplied to the input transmission line to power preamplifiers or WEFAX downconverters.

6. Price Information: US$1,200

7. Delivery Schedule: Stock to 90 days

8. Additional Comments: Receiver price includes a +12 VDC main power supply and crystals for 137.5 and 137.62 MHz for reception of the two operational NOAA/APT frequencies. Additional crystals for METEOR or other spacecraft frequencies are available for US$20 per channel.

9. Equipment Demonstration Locations: By special arrangement

Comoany Name and Address: Microcom
14908 Sandy Lane
San Jose, CA 95124
USA

H. Paul Shuch

Telephone Number:

Telex: Unknown

1. Equipment Type: High-performance receiver; LNA/Downconverter

2. Equipment Used for the Following Satellites/Data Transmission: APT Satellites: GOES, GMS, METEOSAT, NOAA; Data: WEFAX, APT, HRPT, VISSR

3. Equipment Trade Name/Model: Microcomm Model RX-1691 integral downconverter

4. Equipment Description: Heterodyne downconversion unit, including low-noise preamplifier, bandpass filter, local oscillator, balanced mixer and IF amplifier. Enables VHF (137.5 MHz) receivers to process S-Band (1691 MHz) signals, from dishes as small as 0.5 meter diameter.

5. Special Features: Typical specifications: 1691 MHz in, 137.5 MHz out. 2.5 dB noise figure; 30 dB conversion gain. 80 dB dynamic range; high-reliability integral microstrip construction. Operates from +12 MC power supply.

6. Price Information: US$795 FOB San Jose, California. All orders must be prepaid in full, in U. S. dollars.

7. Delivery Schedule: Stock to 90 days ARO

8. Additional Comments: A detailed instruction manual (RX-1691) is available for US$12 postpaid for U.S. delivery, US$14 elsewhere. Purchase price of manual is credited against subsequent purchase. Since 1975, Microcomm downconverters have represented the state-of-the-art in microwave satellite reception.

9. Equipment Demonstration Locations: 14908 Sandy Lane
San Jose, California
USA

Write to arrange demonstration.

Company Name and Address: Microdyne Corporation
International Sales Office
P. 0. Box 1527
Rockville, MO 20850
USA

Kenneth B. Boothe
Manager, International Sales

Telephone Number: (301) 762-8500

Telex: 710-828-0477 Microdyne RV

1. Equipment Type: Commercial-type modular telemetry receivers that can be readily configured for all meterorological satellites, except X-band Landsat-D.

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/HRPT; GOES/Stretched VISSR; DMSP; NIMBUS-G/HCMM; METEOSAT/(all modes); NOAA/APT; NOAA/TIP; GOES/WEFAX; GMS and GMS/MDUS.

3. Equipment Trade Name/Model: 1) Model 1100-AR Manual Telemetry Receiver 2) Model 1400-MR Microprocessor-Controlled Telemetry Receiver (advanced design).

4. Equipment Description: Modular construction of both model telemetry receivers permits configuration to fit any meteorological satellite format by the appropriate selection of plug-in modules, except X-band LANDSAT-0.

5. Special Features : Only one basic receiver is required for present or future meteorological_ satellites, simply by changing appropriate pug-in modules for data and antenna tracking. See pages 23 and 24 of 1100-AR data sheet, available upon request, for comprehensive details.

6. Price Information: Prices range from US$14,000 to US$30,000, depending on satellite and plug-in module configurations required.

7. Delivery Schedule: 150 days ARO

a. Additional Comments: Model 1100-AR is backed by over 9,000 hours MTBF and field-proven performance throughout the world for the past 17 years. New Model 1400-MR is based on unique years of experience gained with the 1100-AR design and the incorporation of the latest state-of-the-art microprocessor control and wide data bandwidth demanded by present and future met requirements.

9. Equipment Demonstration Locations:

1) Microdyne Corporation
627 Lofstrand Lane
Rockville, Maryland 20850
USA
(301) 762-8500

2) Microdyne Corp
714 Blue Oak Avenue
Thousand Oaks, California 91320
USA
(805) 498-1514

3) Microdyne Corp
491 Oak Road
Ocala, Florida 32672
USA
(904) 687-4633

Company Name and Address:
18713 Mooney Drive
Gaithersburg, MD 20879
USA

Robert J. Brown

Telephone Number: (301) 258-8400

Telex: 908167; 908153

1. Equipment Type: Portable local user terminal (LUT) for VHF downlink on 136.77 MHz and 137.77 MHz.

2. Equipment Used for the Following Satellites/Data Transmission: Aquisition and processing of DCPLS (TIP) data from NOAA spacecrafts.

3. Equipment Trade Name/Model: IBM PC/XT-based LUT controller unit; FG7111 RF system; l-megabyte bubble memory storage; two antennas; printer/keyboard unit suitable for both local and remote operation; control and signal cables, 100 meters each; MIL-SPEC carrying cases for all units.

5. Special Features: Provides two levels of user access for data security. DRIBU code formatting for direct insertion onto GTS circuit; concurrent access by one local and one remote user; calculates forecast of satellite rise/set times for a given number of hours; dials phone number to a remote facility to transfer data upon system saturation

6. Price Information: Minimal systems -- US$19,500; Full system--US$39,000

7. Oelivery Schedule: 6 months ARO

8. Additional Comments: Microlog Corp., a subsidiary of Old Dominion Systems, Inc., has designed and developed the LUT specifically for the National Data Buoy Center (NDBC), located in Bay St. Louis, Mississippi. The NOBC is perhaps the single most active ARGOS participant in the world. This organization prepared the LUT specifications, and at the end of a competitive procurement process the task was awarded to Microlog. The LUT has the following physical characteristics:
--completely portable, and deployable by one man in less than 3 hours
--consists of units which when packed in their MIL-SPEC carrying cases weigh less than 25 kg each
--operates on switch-selectable power, 115/230 VAC ± 10% and 47 Hz to 63 Hz -- contains no moving parts --designed to meet or exceed reliability requirements in compliance with MIL-HOBK-217 and shock and vibration as per EIA Standard RS-414-A --protected to Level-l as specified in NWS Transient Susceptibility Standard --constructed of components and subassemblies which are readily available and of proved reliability

9. Equipment Demonstration Locations: Gaithersburg
Maryland
USA

Company Name and Address: Northern Video Graphics, Inc.
Box 92
511 11 Avenue South
Minneapolis, MN 55415
USA

Noel J. Petit
President

Telephone Number: (612) 338-6589

Telex: 4310073

Northern Video Graphics, Inc.(A):

1. Equipment Type: WEFAX Receiving System

2. Equipment Used for the Following Satellites/Data Transmission: GOES, METEOSAT

3. Equipment Trade Name/Model: NVG WEFAX Two-meter system

4. Equipment Description: Two-meter parabolic antenna with WEFAX receiver; spun-aluminum antenna with polar-equatorial mount

5. Special Features: None given

6. Price Information: US$5,995

7. Delivery Schedule: 12 weeks after receipt of order

8. Additional Comments: Up to 75 m (250 feet) between indoor receiver and antenna. Uses inexpensive RG-59 coax; rack-mount receiver

9. Equipment Demonstration Locations: Factory
Minneapolis, MN
USA

Northern Video Graphics, Inc.(B):

1. Equipment Type : GOES image display units
2. Equipment Used for the Following Satellites/Data Transmission: GOES, METEOSAT, GMS, NOAA/APT, WEFAX
3. Equipment Trade Name/Model: Model 600K/4, 600K/8, 600K/16, 600K/32, 600K/48
4. Equipment Description: Video display of satellite facsimile imagery. Solid-state RAM storage of images. Multi-speed animation.
5. Special Features: Image selection on time and sector. Enhancement. Digital interface
6. Price Information: 600K/4 = US$6,500; 600K/8 = US$8,000; 600K/16 = US$9,950; 600K/32 = US$12,450; 600K/48 = US$14,950
7. Delivery Schedule: 12 weeks after receipt of order
8. Additional Comments: None
9. Equipment Demonstration Locations: Factory
   Minneapolis, MN
   USA
   or video tape

Northern Video Graphics, Inc.(C):

1. Equipment Type: NOAA/APT Receiving 'System
2. Equipment Used for the Following Satellites/Data Transmission: NOAA/APT
3. Equipment Trade Name/Model: NOAA/APT Receiving System
4. Equipment Description: Omni-directional with 10 channels of APT and TIP data reception
5. Special Features: No satellite tracking necessary. Computer interface optional.
6. Price Information: US$4,950
7. Delivery Schedule: 12 weeks ARO
8. Additional Comments: All weather antenna suitable for mobile/shipboard use. Receiver can be configured for WEFAX reception in addition to APT. Modularized receiver and antenna system can be configured for APT, TIP, WEFAX, HRPT with optional modules.
9. Equipment Demonstration Locations: Contact factory
   Minneapolis, MN
   USA

Company Name and Address: Raytheon Marine Co.
676 Island Pond Rd
Manchester, NH 03103
USA

Marketing Department

Telephone Number: (603) 668-1600

Telex : 94-3459; 710-220-1339; 6817359; FAX: (603) 624-3056

1. Equipment Type: Complete receiving and color-enhanced display for fixed or shipboard use

2. Equipment Used for the Following Satellites/Data Transmission: APT, HRPT

3. Equipment Trade Name/Model: JCV-16E Oceanograpic color display

4. Equipment Description: Fully-integrated APT, HRPT reception system to automatically receive and process satellite data and orbit data. 16-color scale enhancement of received data with one degree lat/lon grids and own ship mark. Variable scale and scrolling and zoom with selectable cold/warm, natural or complementary color.

5. Special Features : Receives visible and infrared channel data, displayed on a high-resolution color mointor in real time, 2 page storage or 18 page build-in video tape storage. Interfaces to navigation, temperature and depth sensing instruments and color printers for hardcopy.

6. Price Information: Contact for quotation

7. Delivery Schedule: Contact for quotation

8. Additional Comments: The JCV-16E provides a microprocessor-enhanced color display which can be stored and/or worked in scale, zoom or color and a color hardcopy can,be made with the optional color printer. Navigation, temperature, and HF RTTY (TBUS orbital data) can be interfaced to the JCV-16E for a fully automatic, stand-alone system.

9. Equipment Demonstration Locations: Contact Raytheon Marine, Co. for arrangements.

Comoany Name and Address: SASC Technologies, Inc.
4400 Forbes Blvd
Lanham, MO 20706
USA

James R. Norton
Director, Program Development

Telephone Number: (301) 794-5000

Telex: 317630

1. Equipment Type: Complete ground receiving and processing station.

2. Equipment Used for the Following Satellites/Data Transmission: NOAA/HRPT; LAC, GAC; GOES/VISSR

3. Equipment Trade Name/Model: --NOAA/GOES Receiving Station

4. Equipment Description: Minicomputer-based station including fixed and tracking antennas, LNAs, downconverters, -receivers, bit and frame synchronizers, digital image processor and pnoto-quality hardcopy device.

5. Special Features: Simultaneous reception from multiple satellites. Unattended operation from acquision through hardcopy product generation. Gridded, gamma corrected, earth-curvature-corrected near-real-time display of the data during the acquisition.

6. Price Information: Price is dependent on the configuration and throughput requirements.

7. Delivery Schedule: 8-24 months depending on configuration

a. Additional Comments: The METSAT station is modular in design and can be adapted to the requirements of the user. Variations range from single satellite through multiple satellite reception and processing.

SASC Technologies also provides other environmental satellite receiving and processing stations including LANDSAT and SPOT.

9. Equipment Demonstration Locations: Unknown, assume: Lanham, Maryland USA

Company Name and Address: Weather One, Incorporated
3024 Maverick Drive
Colorado Springs, CO 80918-1640
USA •

J. Stroup

Telephone Number: (303) 528-6236

Telex: None available

1. Equipment Type: APT, HRPT, DSB, VISSR, SAV, WEFAX, RADAR

2. Equipment Used for the Following Satellites/Data Transmission: Equipment for receiving GOES, NOAA, Russian Satellites (METEOR), LANDSAT, as well as color weather radar systems. SCPC and RDM equipment, also.

3. Equipment Trade Name/Model: Equipment is marketed under the trade name of Weather One and there are several models. Complete turnkey custom systems are available. All units are hand made to very high standards.

4. Equipment Description: Systems can range from a simple APT station with FAX printer to APT with video display and as exotic as a complete Weather One Model 1 station which includes weather radar. WEFAX. computer graphics and dedicated access to major radar sites'around'the U.S.

5. Special Features: Each unit is custom made and many options are available. Remote computer comtrol, etc.

6. Price Information: From US$4,999 to US$650,000 for a LANDSAT system.

7. Delivery Schedule: Approximately 45-60 days after receipt

a. Additional Comments: All equipment is built to military specifications and each unit is built to order. Installation and on-site service is available worldwide. Only the finest quality, highest tolerance components are used. All units are burned-in for a period of 14 days.

Warranty on all equipment 90 days.